

REMARKS

Claims 1-3 are pending in this application. Claim 1 has been amended herein.

Support for the amendment to claim 1 may be found on page 10, line 25, and page 11, line 2, of the specification.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorrestijn et al. (U.S. Patent No. 4,427,795). (Office action points no. 2-4).

Reconsideration of the rejection is respectfully requested in view of the amendment to claim 1.

The present invention relates to a foamable poly(vinyl chloride) resin composition comprising (A) a poly(vinyl chloride) resin, (B) a processing aid and (C) a foaming agent. By forming a polymer comprising monomer mixture (b) on the outer layer of a polymer of monomer mixture (a) comprising methyl methacrylate, the processing aid (B) can specifically improve gelation properties, processability and foamability and the effects of adding processing aid (B) are efficiently exhibited (page 9, lines 11 to 15, of the present specification). Also, mixture (a) contains at least 50 % by weight of methyl methacrylate and when the amount of methyl methacrylate is less than 50 % by weight, transparency and foamability decrease (page 8, lines 3 to 7, of the present specification). These effects are also evident from comparing Examples 1 to 14 and Comparative Examples 1 to 6.

Also, in the present invention, water or substances which generate vapor when heated, such

as boric acid, are added as the foaming agent (C). The amount of water added is 0.5 to 15 parts by weight based on 100 parts by weight of the vinyl chloride resin and when the amount is less than 0.5 parts by weight, sufficient expansion ratio cannot be obtained (page 14, lines 13 to 14, of the present specification).

Dorrestijn et al. discloses a rigid polyvinyl chloride foam containing 0.1 to 15 parts by weight of homo- or copolymer of an alkyl methacrylate having an alkyl group of 1 to 10 carbon atoms, based on 100 parts by weight of polyvinyl chloride. The alkyl methacrylate is described as preferably being methyl methacrylate (column 1, lines 60 to 63, of Dorrestijn et al.). Furthermore, Dorrestijn et al. describes that a graft polymer comprising butadiene, alkyl methacrylate and styrene may be added as a impact strength modifier (column 2, lines 50 to 54, of Dorrestijn et al.) and that calcium carbonate or citric acid may be added as a impact strength modifier (column 2, lines 50 to 54, of Dorrestijn et al.) and that calcium carbonate or citric acid may be added as a nucleating agent (column 4, lines 3 to 7, of Dorrestijn et al.).

The Examiner apparently regards the graft polymer, which is a impact strength modifier, as the processing aid (B) of the present invention and therefore may also regard the homo- or copolymer of an alkyl methacrylate having an alkyl group of 1 to 10 carbon atoms as the processing aid (B). However, Applicants respectfully submit that the recited processing aid (B) in claim 1, as amended, differs from both the alkyl methacrylate homo- or (co)polymer and graft polymer.

In the processing aid (B) of the present invention, a polymer comprising monomer mixture (b) is formed on the outer layer of the polymer of monomer mixture (a) comprising methyl methacrylate. In claim 1 as amended, the content of monomer mixture (a) is 60 to 95 parts by weight

and the content of monomer mixture (b) is 5 to 40 parts by weight. Therefore, processing aid (B) is a polymer comprising two layers, and is clearly differentiated from the alkyl methacrylate homo- or (co)polymer and graft polymer of Dorrestijn et al..

Also, Dorrestijn et al. discloses a polymer obtained by graft polymerizing methyl methacrylate to a butadiene-styrene resin or butadiene resin containing at least 50% by mole of butadiene as an impact strength modifier. However, this polymer does not contain at least 50% by weight of methyl methacrylate in the first layer, as required by the present claims.

Therefore, the processing aid (B) of the present invention differs from the homo- or copolymer of an alkyl methacrylate having an alkyl group of 1 to 10 carbon atoms or impact strength modifier of Dorrestijn et al. Also, the excellent effects of specifically improving gelation properties, processability and foamability, efficiently exhibiting the effects of adding the processing aid and improving transparency and foamability, which are caused by the processing aid having a two-layer structure, in which the first layer of the two-layer structure contains at least 50 % by weight of methyl methacrylate, are not suggested by and are unpredictable from Dorrestijn et al.

Furthermore, the Examiner points out that in Dorrestijn et al., carbon dioxide and water are produced from the reaction of citric acid and inorganic carbonate, which are described as **nucleating agents**, when forming the foam. However, Dorrestijn et al. does not describe using water as a foaming agent and, moreover, citric acid and calcium carbonate are used independently in Examples of Dorrestijn et al., indicating that citric acid and calcium carbonate are not used for the purpose of producing water. Even if the 1 part of citric acid added in Example 2 of Dorrestijn et al. was to be decomposed by heat to produce water, the amount produced would be 0.37 part at a maximum and

would not satisfy the water content of the present invention.

Consequently, the excellent effect of significantly improving expansion ratio by using water instead of an organic solvent foaming agent which requires explosion-protective facilities is unpredictable from Dorrestijn et al.

Amendment under 37 CFR 1.111
Takenobu SUNAGAWA et al.

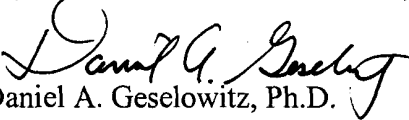
U.S. Patent Application Serial No. 10/069,953
Attorney Docket No. 020283

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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